Low-Cost High-Performance Hall Thruster Support System, Phase I

Completed Technology Project (2010 - 2010)

Project Introduction

Colorado Power Electronics is in the process of completing NASA SBIR contract NNC07CA12C Wide Output Range Power Processing Unit for Electric Propulsion. At the end of the project, we will have a complete brassboard PPU except for the Digital Control and Interface Unit (DCIU) and Flow Control Driver. The brassboard PPU meets the electrical requirements of the project, but the specific mass is about 20% too low compared to the first bullet of the solicitation. Preliminary results from testing a 4 kW discharge supply show that the full-power efficiency ranges from 94% to 96%. This proposal is to: (1) Determine ways to reduce the mass of the brassboard PPU (2) Evaluate the brassboard PPU to determine robustness improvements to be implemented in Phase II. (3) Determine requirements for a DCIU to be implemented in Phase II. (4) Design and build a brassboard Flow Control Driver (5) Gain experience in controlling gas flow The Flow Control Driver will be designed to control a xenon gas flow system selected by NASA. The DCIU design will be based on requirements received from NASA. The significance of this project is that it makes improvements to an innovative and promising PPU technology, moving it closer to a flight-ready product, while also facilitating NASA research with advanced flow controls.

Primary U.S. Work Locations and Key Partners

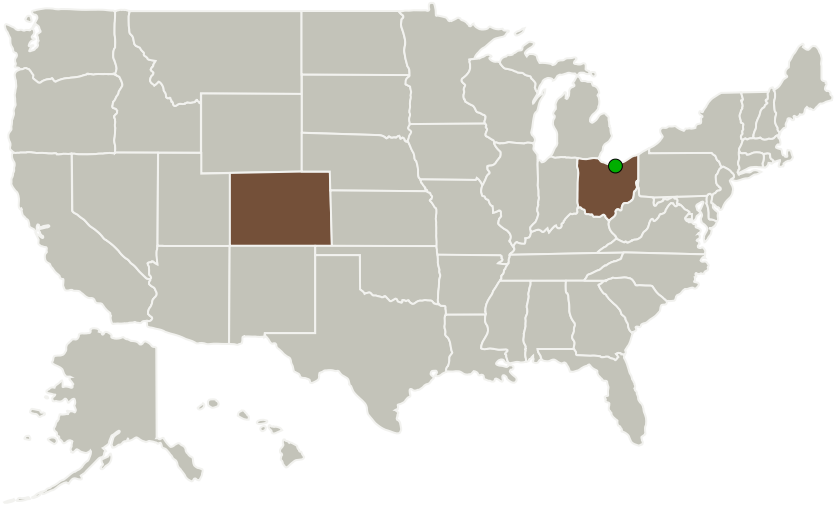

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Table of Contents

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
Colorado Power Electronics, Inc.	Lead Organization	Industry Veteran-Owned Small Business (VOSB)	Fort Collins, Colorado
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
Colorado	Ohio

Project Transitions

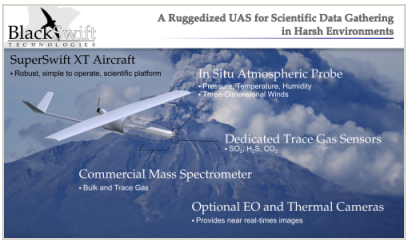
January 2010: Project Start

July 2010: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140029)*

Images



Final Summary Chart Image
Low-Cost High-Performance Hall Thruster Support System, Phase I Project Image
(https://techport.nasa.gov/image/133008)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Colorado Power Electronics, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Bryce L Hesterman

Co-Investigator:

Bryce Hesterman

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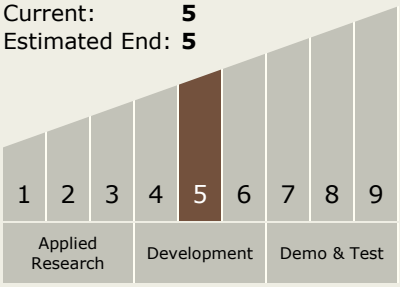
Technology Maturity (TRL)

Start: **5**
Current: **5**
Estimated End: **5**



Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.2 Electric Space Propulsion
    - TX01.2.2 Electrostatic

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System